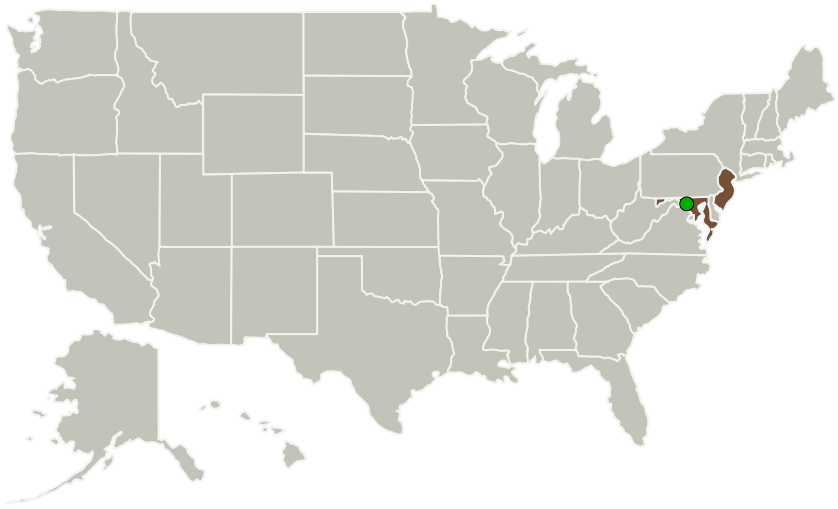
The First Monolithic Silicon Carbide Active Pixel Sensor Array for Solar Blind UV Detection, Phase I

Completed Technology Project (2012 - 2012)

Project Introduction

This Small Business Innovation Research Phase I project will address the needs of space astronomy, military threat detection, and scientific research for image sensors that are sensitive in the ultraviolet while insensitive in the visible spectrum. This is because solar illuminated backgrounds are orders of magnitude greater than the ultraviolet radiation of interest (solar blocking filters exhibit low UV transmission and scattered light). This program will develop monolithic imaging arrays made of 4H-Silicon Carbide, whose band gap is 3.25 eV versus 1.12 eV for silicon. This results in high UV sensitivity image sensor arrays with very low response in the visible/infrared along with negligible dark current without the need for cooling. Monolithic integration of each individual Schottky detector pixel with its own CMOS readout circuitry eliminates reliability concerns common to bump bonding of thin visible-blind semiconductor materials (GaN etc) with silicon readout integrated circuits (ROICs). In addition, Silicon Carbide is a more mature, defect free, material than Gallium Nitride. Finally, the wide band gap of 4H-SiC results in a higher level of radiation tolerance as compared to Silicon.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
United Silicon Carbide, Inc.	Lead Organization	Industry	Monmouth Junction, New Jersey
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	New Jersey

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137361)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

United Silicon Carbide, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Leonid Fursin

Co-Investigator:

Leonid Fursin

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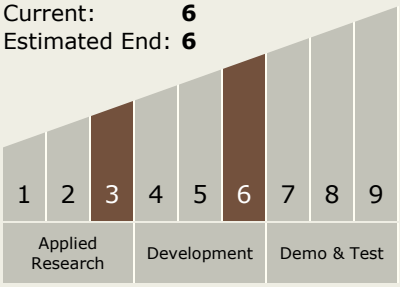
Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System